

WEIGHT LIFTING APPARATUS

Related Applications

This application claims the benefit of the filing date of U.S. Patent Application No.
5 60/414,405, filed September 30, 2002, the contents of which are incorporated herein by
reference in their entirety.

Field of the Invention

This invention relates to portable exercise apparatus. In particular, this invention relates
10 to a weight lifting apparatus which is portable and which provides for isolation and exercise of
specific muscles during weight lifting. This invention also relates to an improved weight plate
system.

Background of the Invention

15 In exercise for conditioning and building strength of muscles, such as in weight-training,
targeting of specific muscles or muscle groups produces superior results. For this reason there
is available a diverse array of weight-training equipment, mostly in the form of complex
machines employing levers, cables, and pulleys, any one of such machines being dedicated to
the conditioning of only a single muscle or small group of muscles. An individual seeking a
20 complete workout using such machines must therefore use many different machines to achieve
his/her goal. A potential drawback of using a weight-training regime employing such machines
is the considerable time required in using many machines to complete the workout. Further, it is
impossible for most individuals to set up home gyms using such machines because of their
substantial cost and space requirement.

25 An alternative to large weight-lifting machines is small portable equipment. Traditionally,
such equipment has consisted primarily of dumbbells and/or barbells. These have an
advantage over the above-mentioned machines in that they are relatively inexpensive and
portable. Exercising specific muscles or small groups of muscles can be achieved, albeit to a
limited degree, by varying techniques and grip positions. However, technique is critical to the
30 success of a weight-training regime employing such equipment, and there exists the possibility
of injury to the user in the event of poor technique, attempting to lift too much weight, or dropping
a weight.

Attempts to overcome the above-noted shortcomings of dumbbells and/or barbells have resulted in a number of alternatives being proposed. For example, U.S. Patent No. 6,338,702 to Jordan teaches a weight lifting bar having a pair of handles and a holder between the handles for mounting a barbell weight thereto. The handles are rotatably attached to the holder, and can
5 rotate about an axis transverse to their longitudinal axis. The weight can rotate on the bar, to avoid a twisting force of the weight, due to its moment of inertia, being transferred to a user during weight-lifting exercises. U.S. Patent No. 4,828,256 to Lee discloses a barbell comprising a bar passing through a hole in a weight, such that the weight is disposed between the two ends of the bar. As with the Jordan patent, above, the weight can rotate on the bar to avoid a twisting
10 force of the weight being transferred to a user during weight-lifting exercises. U.S. Patent No. 6,190,292 to Panes relates to an exercise device comprising a resilient ball disposed between two handles, for two-handed use. Either handle may be removed, to permit one-handed use. However, none of the above-mentioned apparatus provides sufficient versatility to permit a range of weight-lifting exercises, and hence the conditioning of many different muscles and
15 muscle groups.

Summary of the Invention

In accordance with a broad aspect of the invention there is provided a weight lifting apparatus comprising: a frame having a handle disposed thereon; and a member extending from
20 said frame for attaching one or more weights thereto, the member being substantially co-planar with said frame; wherein said handle swivels coaxially about its longitudinal axis.

In one embodiment, the frame comprises four sides and said swiveling handle comprises one of said sides. In a further embodiment, the member extends from a side of said frame which is substantially parallel to said handle. In various embodiments, the member extends
25 substantially perpendicular with said handle, or substantially parallel with said handle. In a further embodiment, the apparatus comprises means to attach said apparatus to a user's foot and/or leg. In a preferred embodiment, said means to attach said apparatus to a user's foot and/or leg comprises straps.

In accordance with another aspect of the invention there is provided a weight lifting
30 apparatus comprising: a first frame having a handle disposed thereon; a second frame having a handle disposed thereon; and a member extending between said first and second frames for

attaching one or more weights thereto, the member maintaining said first and second frames aligned such that their respective handles are substantially parallel to each other and distal to said member; wherein said handles swivel coaxially about their longitudinal axes; and wherein the member is substantially perpendicular to said longitudinal axes of said handles.

5 In one embodiment the first and second frames each comprise four sides and said swiveling handles each comprise one of said sides. In a further embodiment the member extends from a side of each said first and second frame which is substantially parallel to said handle.

10 In another embodiment, the member further comprises an arm for accepting weights, said arm extending substantially perpendicularly from said member. In one such embodiment, the arm extends from a midpoint of the length of said member.

15 In accordance with a further aspect of the invention there is provided a weight-lifting kit, comprising a frame having a swiveling handle disposed thereon; and a member extending from said frame for attaching one or more weights thereto, the member being substantially co-planar with said frame; wherein said handle swivels coaxially about its longitudinal axis; and instructions for using said kit to carry out weight-lifting exercises. In one embodiment, the kit further comprises means to attach said apparatus to a user's foot and/or leg.

20 In another embodiment, the kit comprises a first frame having a swiveling handle disposed thereon; a second frame having a swiveling handle disposed thereon; and a member extending between said first and second frames for attaching one or more weights thereto; the member being substantially co-planar with said first and second frames; wherein said handles are distally located on said apparatus; and wherein said handles swivel coaxially about their longitudinal axes; and instructions for using said kit to carry out weight-lifting exercises.

25 In accordance with the invention, the kits may further comprise one or more weights.

30 According to another aspect of the invention there is provided a weight plate having a rebate on an edge thereof. In one embodiment said rebate is disposed on a lobe of said weight plate. In a further embodiment, the weight plate is provided with an indexing system which, when two or more such weight plates are stacked, prevents overlap of the lobes of the weight plates.

30 The invention also provides a weight plate system, comprising at least two weight plates each having a rebate on an edge thereof. In another embodiment, the weight plate system

comprises at least two weight plates each having at least one lobe, and a rebate on each said lobe. In a further embodiment, the weight plate system further comprises indexing disposed on each weight plate, said indexing preventing overlap of lobes of adjacent weight plates when said weight plates are stacked.

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Brief Description of the Drawings

The invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

10 Figure 1 is a schematic diagram of a weight lifting apparatus according to an embodiment of the invention;

 Figure 2 shows the embodiment of Figure 1 configured for leg exercises;

 Figure 3 is a schematic diagram of a weight lifting apparatus according to a further embodiment of the invention;

15 Figure 4 shows a variation of the embodiment shown in Figure 3;

 Figure 5 is a schematic diagram of a weight lifting system according to the invention; and

 Figure 6 is a schematic diagram of a weight plate system according to the invention.

Detailed Description of the Invention

20 According to a broad aspect of the invention, there is provided a weight lifting apparatus which provides for the center of gravity of a weight to be maintained below the point where the apparatus is gripped by a user, as the user raises and lowers the apparatus. The center of gravity of the weight is thus maintained centered about the user's body, which improves the user's control of the weight and improves efficiency of the exercise.

25 As can be seen in the embodiment shown in Figure 1, the apparatus comprises a frame 1 having a handle or grip 2 and a member or rod 3 extending from the frame. The rod 3 accepts one or more weight disks 8, such as conventional weight disks, and is adapted to retain the weight disks securely, using, for example, a series of holes, each of which can accommodate a clip 5. A washer 4 is optionally disposed between the weight disk 8 and the clip 5. The
30 embodiment shown in Figure 1 constitutes a dumbbell.

 It will be appreciated that when holding the frame 1 by the grip 2, the weight will hang

below the grip and the center of gravity of the weight will be maintained below the grip during weight-lifting exercises. Preferably, the handle or grip 2 swivels about its longitudinal axis. In one embodiment, shown in Figure 1, the grip comprises an outer coaxial sleeve 2a which swivels on the inner frame member. In other embodiments, bearings, bushings, and the like can be employed in the swivel grip. The swivel grip enhances performance and comfort of the apparatus by allowing the center of gravity of the weight 8 to swing below the grip 2 as the dumbbell is moved during exercises.

The rod 3 can be permanently attached to the frame 1; however, it is preferred that the frame 1 is adapted so that the rod 3 can be removed therefrom. For example, as shown in Figure 1, the frame 1 can be provided with a hole 10 to accept the rod 3, and a second transverse hole 12 which accepts a pin 6 inserted through the frame 1 and the rod 3, and secured by a clip 7 or other suitable arrangement. In such an embodiment, a central portion 9 optionally disposed in the frame 1 accepts the rod 3 axially. The rod 3 can be secured at various amounts of penetration into the hole 10 using the pin 6 and locking clip 7. In a further embodiment, the portion 14 of the frame 1 which is parallel to the grip 2 is adapted to accept the rod 3 axially; for example, by providing a hole 16 at each end thereof (only one such hole is shown in Figure 1). In such embodiment, the rod 3 is secured coaxially within the frame portion 14 by passing the pin 6 through the hole 12 and a hole of the rod 3.

As a dumbbell, the embodiment shown in Figure 1 is ideally suited to exercises requiring one-handed use, although it can also be used with a two-handed grip. In addition to the grip 2, the frame 1 may be gripped at other locations, such as, for example, the central portion 9 of the frame and the outer frame portions 11 which are parallel to the central portion 9. Such various points of grip provide versatility required for exercising different muscles and/or groups of muscles, because different grips, relative to the weight, are required for different exercises.

Examples of the type of exercises that can be performed include, but are not limited to, one and two arm curls, tricep extensions, dumbbell flies, shrugs, dumbbell raises (forward, reverse, and side), tricep kicks, and overhead presses. In all such exercises, the center of gravity of the weight is maintained below the point where the apparatus is gripped by a user. Thus, little or none of the user's energy is spent balancing and steadying the weight, resulting in a substantial improvement in the efficiency of the exercise. Moreover, in maintaining the center of gravity of the weight below point of grip as the weight is moved through an exercise routine, the swivel grip

2a eliminates torque on the user's wrist. As a result, there is less fatigue, and more energy can be devoted to conditioning the muscle or muscles of interest.

In accordance with the above, depending where the frame 1 is gripped can have a marked difference in the effective weight (i.e., the weight "experienced") by the user. While not wishing to hold to any particular theory at the exclusion of others, it is believed that this effect is caused by the moment arm created when the weight is displaced longitudinally from the center of effort (i.e., the point where the frame is gripped). The invention thus provides for varying the intensity of a workout, simply by changing the position of grip on the frame 1, without reconfiguring the apparatus. This effect can be exploited by varying the position of the weight 8 along the rod 3, and/or varying the amount of extension/insertion of the rod 3 into hole 10. In the case of the former, one or more weights 8 can be secured at any position along the rod 3 by, for example, installing a clip 5, and optionally washer 4, on either side of the weight.

As shown in Figure 2, the embodiment of Figure 1 (shown without frame portion 9) can be attached to a user's foot, using, for example, straps 30 with suitable fasteners such as Velcro® or buckles. This configuration provides for leg exercises such as extensions, curls, side lifts, and the like. In such configuration, the rod 3 can be inserted into either of the holes 16 provided in the frame portion 14, so as to dispose the weight either above or below the user's foot. Preferably, the frame 1 is configured with the weight disposed below the user's foot, which configuration provides the full benefit of the invention; that is, maintaining the center of gravity of the weight below the point of grip. However, in situations where such configuration is inconvenient, the frame can be configured with the weight above the user's foot as shown in Figure 2.

Figure 3 shows an embodiment in which the invention is configured as a barbell. This embodiment is suitable for weight lifting exercises where a two-handed grip is used, such as a bench press. This embodiment comprises two frames 1 (shown without frame portion 9), one attached to each end of the rod 3. One or more weight disks 8 are placed on the rod 3 between the frames 1. In a preferred embodiment, shown in Figure 4, the rod 3 is "T" shaped, such that it has disposed midway along its length a perpendicular portion or arm 3a. Like the rod 3, the perpendicular portion 3a is appropriately sized to accommodate weights, and is adapted to secure one or more weights thereon. For example, the perpendicular portion 3a can be provided with a series of holes to accept locking pins to secure weights, like the rod 3 in Figures

1 to 3. Preferably, the longitudinal axis of the perpendicular portion 3a is substantially perpendicular to the longitudinal axis of the grips 2, such that any weight disks 8 secured thereto will be disposed only on one side of the apparatus. This facilitates performing an exercise such as a bench press, since the apparatus can be lowered all the way to the chest, even when many weight disks are stacked thereon. It will be appreciated that in this configuration the center of gravity of the weight is not below the point of grip. However, unlike a conventional barbell, the center of gravity of the weight is between the two grips, and thus the center of effort is maintained at or close to the center line of the body, which substantially improves the user's comfort and control of the weight, and the efficiency of exercise.

In the embodiment shown in Figures 3 and 4, the frames 1 and rod 3 can be constructed as a unit. In such case, the portion connecting the two frames 1 need not be a rod and instead can be of any design. However, it is preferable that the frames 1 and rod 3 are each separate units, like those shown in Figure 1, so that they can be used separately as dumbbells, or assembled as in Figures 3 and 4, as a barbell. In accordance with the invention, having separate components provides great versatility in the range of weight lifting exercises that can be performed with a minimal amount of equipment. That is, with only a pair of frames 1, a rod 3, weights, and required locking pins, clips, and straps, a complete weight-lifting workout, in which specific muscles and groups of muscles can be isolated, is possible.

In accordance with another aspect of the invention there is provided a weight lifting kit.

In one embodiment, the kit comprises a frame 1, rod 3, straps 30, and required hardware for assembling the apparatus and securing weights thereto, such as a pin 6, clips 5 and 7, and washer 4. In another embodiment the kit further comprises one or more weight disks. In yet another embodiment, the kit further comprises a second frame 1 and a second rod 3, and optionally a rod 3 having portion 3a, and required hardware for assembling two dumbbells or one barbell. According to the invention, such kits optionally comprise a carrying case. The kits of the invention provide great versatility in the range of weight lifting exercises that can be performed with a minimal amount of equipment. Further, the weight lifting apparatus is compact and portable, and hence can easily be transported for use anywhere.

In accordance with another aspect of the invention there is provided a complete exercise system which utilizes the dumbbell frame 1 as described above. In one embodiment, shown in Figure 5, the exercise system comprises a bench 40 having an adjustable backrest portion 44, a

frame 50 with stub shafts 52 for storage of weight disks 8 and dumbbell frames, cradles 56 to accommodate a barbell 60 as described above with reference to Figure 4, and a detachable leg extension apparatus 70. The leg extension apparatus attaches to the bench support 42 with a locking mechanism such as a pin and locking clip like those described above for securing the
5 rod 3 to the frame 1. The bench 40 is pivotally attached to the frame 50, so that when the leg extension apparatus is removed, the bench can be folded up and into the frame 50, for compact storage.

The pivot point 72 of the leg extension apparatus 70 has two or more positions. In one position, the arc traveled by the apparatus 70 is of a smaller radius and is appropriate for leg
10 extensions and curls. Two pairs of padded collars, corresponding to reference numerals 74 and 76, respectively, are provided for these exercises. With the pivot point 72 in another position, the arc traveled by the apparatus 70 is of a larger radius, and is suitable for pull-down exercises, which can be performed by a user lying on the bench with his/her head at the end of the bench closest to the extension apparatus. A pair of dumbbell frames 1, as described above with
15 reference to Figure 1, are provided for pull-down exercises. Seated-row exercises can also be performed by a user seated at the end of the bench facing the extension apparatus and grasping the dumbbell frames 1.

In accordance with another aspect of the invention, there is provided a weight plate system. As discussed above, the dumbbell frame 1 with rod 3 can be used with any
20 conventional system of weight disks. However, most conventional weight disks have inherent drawbacks, namely, when stacking, the weights create a pinching hazard to the fingers, and the weights are difficult to pick up from a smooth surface, owing to the lack of a grip point. The weight plate system of the invention overcomes these drawbacks. Firstly, as shown in Figure 6, the weight plates 80 are not fully round; rather, they are scalloped or lobed. The lobes on all
25 plates can be of substantially the same shape, or they can be of different shapes (e.g., Figure 6B). In addition, the edges of the lobes are rebated on one side of the plate, indicated by reference numeral 84, providing clearance for fingers so that the plates can easily be gripped and picked up from a flat surface. Secondly, the weight plates of the invention are provided with an indexing system, such that when stacked on a dumbbell or barbell, the plates fit together in a
30 manner that avoids overlapping of the lobes of adjacent plates (e.g., with lobes alternately arranged). This provides room for fingers between edges of plates and hence substantially

reduces the possibility of fingers being crushed between plates. In one embodiment the indexing system comprises a series of regularly-spaced indentations 86 and one or more projections 88 on both sides of each plate. The indentations and projections are arranged on plates such that when plates are stacked, the indentations receive the projections so as to
5 maintain lobes of plates in a non-overlapping relationship. Weight plates according to the invention are compatible with conventional weight lifting equipment.

The contents of all cited publications are incorporated herein by reference in their entirety.

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Equivalents

Those skilled in the art will recognize or be able to ascertain variants to the embodiments described above. Such variants are understood to be within the scope of the invention and are covered by the appended claims.

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